

REMARKS

The action by the Examiner of this application, together with the cited references, have been given careful consideration. Following such consideration, claims 1, 4-6 and 8-9 have been amended to more clearly define the applicant's invention. A marked up version of the amended claims are attached hereto, in accordance with 37 C.F.R. 1.121. It is respectfully requested that the Examiner reconsider the claims in their present form, together with the following comments, and allow the application.

The Examiner has objected to figure 4 of the drawings because it lacks the legend "prior art." Accordingly, the applicant submits herewith a proposed drawing correction to FIG. 4, wherein the legend "prior art" is added to the figure. It is respectfully requested that the Examiner consider and approve the proposed new drawing for figure 4.

The Examiner has objected to the specification because the "application does not contain an abstract of the disclosure as required by 37 C.F.R. 1.72(b)." The Examiner's attention is drawn to the abstract which formed a part of the published PCT application (International Publication No. WO00/32337). In order to facilitate entry of this abstract, the present amendment includes an amendment inserting the abstract of the corresponding published international patent application.

The Examiner has objected to claims 6-9 as being in improper form. In particular, the Examiner notes that these claims are improper multiple dependent claims. Claims 6-9 have now been amended to comply with proper claim form. Accordingly, it is respectfully requested that the Examiner withdraw the objection to these claims, and proceed with examination of these claims on the merits.

Claim 2 has also been objected to as being in improper dependent form for failing to further limit the subject matter of a previous claim. In particular, the Examiner notes that the "claim does not fairly further limit independent claim 1 because all materials are to some extent "deformable" at all temperatures, including temperatures above 700 degrees C." The Examiner's argument is respectfully traversed. In this regard, claim 2 specifically defines a temperature range at which the interface zone 13 is structurally solid (i.e., at temperatures up to about 700° C), and defines a temperature range (i.e., temperatures above about 700° C) at which the interface zone 13 becomes deformable without any appreciable chemical degradation. The

specific temperature ranges are not defined in claim 1. Accordingly, it is respectfully submitted that claim 2 further limits independent claim 1.

The Examiner has rejected claims 1-5 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner argues that it is not clear where the “material the thermal properties of which are such that it is substantially solid at ambient temperatures but becomes deformable at elevated temperatures...” is located. Claim 1 has now been amended to clarify that the “material” is in the shock-absorbing interface zone 13.

The Examiner also argues that the term “such as” in claim 4 is indefinite, and that there is no proper antecedent basis for the term “the co-operation assembly surfaces” in claim 5. Claims 4 and 5 have been amended to address these issues raised by the Examiner. In view of these amendments, it is respectfully requested the Examiner withdraw the 35 U.S.C. 112, second paragraph rejection of claims 1-5.

The Examiner has rejected claims 1-5 under 35 U.S.C. 102(b) as being anticipated by King (U.S. Patent No. 4,738,380). In addition, the Examiner has also rejected claims 1-5 under 35 U.S.C. 103(a) as being obvious in view of the combined teaching of King and (European Patent Document No. 0,149,164).

Referring now to independent claim 1, this claim recites a “ceramic pouring tube element 10, supported in a metallic can 11, in which a ceramic support element 12 is encapsulated...” King does not disclose a tube element supported in a metallic can, but rather a tube element 42 supported in a ceramic retainer 46, wherein the ceramic retainer 46 is mortared within a metallic retainer 30. Any gaps between tube element 42 and ceramic retainer 46, or between ceramic retainer 46 and metallic retainer 30, are filled with an ordinary mortar (see column 3, lines 29-41). This mortar must withstand the elevated temperature during metal teeming. In contrast, the invention defined by claim 1 includes a material “the thermal properties of which are such that it is substantially solid at ambient temperatures but becomes deformable at elevated temperatures experienced during metal teeming.” Therefore, the claimed invention recites a material that becomes deformable ^{at} at those elevated temperatures present during metal teeming. It is respectfully submitted that one skilled in the art would not find conventional mortar as being equivalent to a material that is deformable at temperatures incurred during teeming. In addition,

it is respectfully submitted that EP '164 also fails to teach or suggest the invention as defined by claim 1.

In view of the foregoing, it is respectfully submitted that independent claim 1 as well as the claims which depend therefrom (i.e., dependent claims 2-9) are patentable over the prior art cited by the examiner.

It is respectfully submitted that the present application is now in proper condition for allowance. If Examiner believes there are any further matters which need to be discussed in order to expedite the prosecution of the present application, the Examiner is invited to contact the undersigned.

If there are any fees necessitated by the foregoing communication, please charge such fees to our Deposit Account No. 50-0537, referencing our Docket No. BE7344PCT(US).

Respectfully submitted,



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CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8

I hereby certify that this correspondence (along with any paper referenced as being attached or enclosed) is being deposited on the below date with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Box Non-Fee Amendment, Assistant Commissioner for Patents, Washington, D.C. 20231.

Date: December 4, 2002


Crystal Belknap

MARKED UP VERSION OF AMENDED SPECIFICATION

ABSTRACT

A refractory device for use in the teeming of molten metal comprising a ceramic body having a ceramic pouring tube element (10, 20) and a ceramic support element (12, 22), said support element being adapted to be received within a metallic can (11, 21), and there is provided between said elements a pyroplastic shock-absorbing interface zone (13, 24) wherein there is provided a material the thermal properties of which are such that it is substantially solid at ambient temperatures but become deformable at the elevated temperatures experienced during metal teeming.

MARKED UP VERSION OF AMENDED CLAIMS

1. (Amended) A refractory device for use in the teeming of molten metal, comprising a ceramic pouring tube element 10, supported in a metallic can 11, in which a ceramic support element 12 is encapsulated and a shock-absorbing interface zone 13 between said metallic can 11 and the ceramic pouring tube element 10, ~~where~~ in which zone there is provided a material the thermal properties of which are such that it is substantially solid at ambient temperatures but becomes deformable at elevated temperatures experienced during metal teeming.

4. (Amended) A refractory device according to claim ~~3~~ 1, wherein the interface zone 13 comprises a ceramic ~~material such as a~~ paste or bonding agent or additional structural ceramic element.

5. (Amended) A refractory device according to claim 3, wherein the pyroplastic material is a frittable composition applied over at least one ~~of the~~ co-operating assembly surfaces of the pouring tube element and the support element.

6. (Amended) A refractory device according to ~~any one of the preceding~~ claims 1, wherein the ceramic support element 12 is fully encapsulated within the metallic can 11, and fits with and around the upper part of the pouring tube element 10 by virtue of said ceramic support 12 element having an internal profile corresponding sufficiently to the external profile of the pouring tube.

8. (Amended) A refractory device according to ~~any one of the preceding~~ claims 1, wherein the ceramic support element 12 is pre-formed from a ceramic material of low thermal conductivity, or formed *in situ* by a suitable casting operation.

9. (Amended) A refractory device according to ~~any one of the preceding~~ claims 1, wherein the refractory device is finished to suit its intended purpose.